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Micheal C. Stages - Assistant Laboratory Councel
Lawrence Livermore National Laboratory
P.O. Box 808, L-703
Livermore, CA 94551

EXAMINER	
LEUNG, CHRISTINA Y	
ART UNIT	**PAPER NUMBER**
2633	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/827,454	RUGGIERO, ANTHONY J.
	Examiner	**Art Unit**
	Christina Y. Leung	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 22 February 2002 .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-49 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-49 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 34-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Akkapeddi (US 4949056 A).

Regarding claim 34, as well as it may be understood with regard to 35 U.S.C. 112 discussed above, Akkapeddi discloses a system (Figure 1) comprising:

a means 10 for transmitting and receiving an interrogating beam;

a communication station operatively coupled to the transmitting and receiving means and having a means 28 for returning a phase conjugate beam to the transmitting and receiving means (column 2, lines 15-60).

Regarding claim 35, Akkapeddi discloses a method (Figure 1) comprising:

transmitting an interrogating beam from a transceiver 10;

receiving the interrogating beam at a communication station;

encoding data (with encoder 26) onto a phase conjugate beam and pumping the encoded phase conjugate reflectivity by nondegenerate four wave mixing (column 2, lines 32-34); and transmitting the encoded phase conjugate beam back to the transceiver (column 2, lines 15-60).

2. Claims 42-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Pepper et al. (US 5038359 A).

Regarding claim 42, Pepper et al. disclose a method of providing an optical interconnect comprising:

transmitting an interrogating beam from a fiber optic device;

receiving the interrogating beam at a micro-mirror 16 across free space;

transmitting a second beam from the micro-mirror to a predetermined phase conjugator 12.

Regarding claim 43, Pepper et al. disclose (Figures 6-10) that the method may further include modulating data onto the second beam at said predetermined phase conjugator (with modulator 62);

transmitting an encoded phase conjugated beam to the micro-mirror 16.

Regarding claim 44, Pepper et al. disclose that the method may further include transmitting a third beam from the micro-mirror to the fiber optic device (Figures 6-10).

3. Claim 34 is rejected under 35 U.S.C. 102(b) as being anticipated by Sharp et al. (US 5317442 A).

Regarding claim 34, as well as it may be understood with regard to 35 U.S.C. 112 discussed above, Sharp et al. disclose a system (Figures 2 and 5) comprising:

a means 23 for transmitting and receiving an interrogating beam;

a communication station 50 operatively coupled to the transmitting and receiving means and having a means 20 for returning a phase conjugate beam to the transmitting and receiving means (column 2, lines 26-42).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-17, 40-41, and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akkapeddi (US 4,949,056 A) in view of Watanabe (US 5,920,588 A) and Pepper et al. (US 5,038,359 A)

Regarding claim 1, Akkapeddi disclose a system (Figure 1) comprising:

a transceiver 10 constructed to transmit an interrogating beam; and

a communication station capable of receiving the interrogating beam.

Akkapeddi further disclose that the communication station includes a phase conjugator but does not specifically disclose that the communication station includes a plurality of intra-cavity phase conjugators arranged in an array.

Watanabe teaches an intra-cavity conjugator (Figure 2) may be used in a system to produce a phase conjugate beam as in the system disclosed by Akkapeddi. Pepper et al. (Figures 9-10; column 10, lines 47-68; column 11, lines 1-17) teach another type of phase conjugator, but also further suggests that phase conjugators may be arranged in an array. It would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi as a way to provide a phase conjugate light beam without requiring a separate source of pump light, and to further arrange the phase conjugators in an array as taught by Pepper et al. to provide a broader area for producing phase conjugation.

Regarding claim 2, Akkapeddi discloses that the communication station is capable of transmitting an encoded phase conjugate beam to the transceiver from the phase conjugator (using encoder 26).

Regarding claim 3, Akkapeddi discloses that communication station is configured to respond to the interrogating beam by encoding data into a phase conjugate beam (using encoder 26) and the phase conjugator taught by Watanabe pumps the encoded phase conjugate beam by intra-cavity nondegenerate four wave mixing (column 16, lines 23-67; column 17, lines 1-3).

Regarding claims 4-5, Akkapeddi does not specifically disclose that the encoding of the phase conjugate beam is accomplished at rates exceeding approximately 1 kHz or in the range of approximately 1Ghz to approximately 10 GHz.. However, Pepper et al. teach that a phase conjugate beam may be encoded at rates including 10 GHz (column 8, lines 32-50). It would have been obvious to a person of ordinary skill in the art to encode the phase conjugate beam as disclosed by Akkapeddi at rates suggested by Pepper et al. as an engineering design choice of an efficient frequency for encoding the beam.

Regarding claim 6, Pepper et al. (Figure 9, elements 148-150) that the plurality of phase conjugators may be arranged in a substantially linear array. Regarding claim 7, Pepper et al. teach that the plurality of phase conjugators may be substantially spaced apart (Figure 9). Regarding claim 9, Pepper et al. teach that that plurality of phase conjugators may be any practical number (column 11, lines 14-17). Regarding claims 6, 7, and 9, it would have been obvious to a person of ordinary skill in the art to use an array of phase conjugators in a configuration as suggested by Pepper et al. in the system disclosed by Akkapeddi in view of Watanabe as an engineering design choice of a way to arrange the phase conjugators.

Regarding claim 8, the phase conjugator taught by Watanabe may comprise a single gain stripe device (Figures 3-4; column 16, lines 23-57).

Regarding claim 10, the intra-cavity phase conjugator taught by Watanabe comprises an aperture sufficient to resolve a substantial portion of the spatial components of the input wavefront of the interrogating beam (Figure 2).

Regarding claim 11, Watanabe does not specifically teach that the intra-cavity phase conjugator comprises an aperture sufficient to resolve greater than approximately 80% of the spatial components of the input wavefront of the interrogating beam, but teaches that it is able to generally resolve a substantial portion of the input wavefront of the interrogating beam (Figure 2). It would have been obvious to a person of ordinary skill in the art to specifically ensure that the aperture is sufficient to resolve greater than 80% of the spatial components of the input wavefront of the interrogating beam in the system disclosed by Akkapeddi in view of Watanabe and Pepper et al. simply in order to ensure that the input wavefront is sufficiently resolved.

Regarding claim 12, Akkapeddi discloses that the communication station does not have a movable part point and tracking system (column 1, lines 28-63; column 2, lines 15-44).

Regarding claim 13, the intra-cavity phase conjugator taught by Watanabe includes a top electrode with an aperture (Figure 2, which shows current supplied to the phase conjugator from driver 7). Again, it would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi in view of Watanabe and Pepper et al. as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

Regarding claim 15, Watanabe teaches that the interrogating beam may interact with pump beams operating in the plurality of phase conjugators in a substantially parallel manner (Figure 2).

Regarding claim 16, Akkapeddi disclose that the transceiver may be mounted on a satellite (Figure 1).

Regarding claim 17, Akkapeddi disclose that the communication station may be mounted on a ground station.

Regarding claim 45, Pepper et al. does not specifically teach that the phase conjugators may be arrange in a two dimensional array, but they do teach that the phase conjugators may be one of a plurality of phase conjugators arranged in an array of phase conjugators (Figures 9 and 10). They do not specifically disclose that this array may be a two dimensional array, but it would have been obvious to a person of ordinary skill in the art to include a plurality of arrays of phase conjugators in the system described by Akkapeddi in view of Watanabe and Pepper et al. as an engineering design choice of a way to arrange the phase conjugators especially since Pepper et al. teach that any number of phase conjugators may be included (column 11, lines 14-17).

Regarding claim 46 in particular, Watanabe teaches that the intra-cavity phase conjugator with the top electrode includes a nonlinear medium adapted to produce at least two coherent pump beams (Figure 2) and a means to encode the coherent pump beams (Figure 16). Regarding claim 47 in particular, Watanabe teaches that the nonlinear medium is a diode structure comprising a modified broad-area distributed feedback laser device.

It would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi in view of Watanabe and Pepper et al. as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

Regarding claim 14, Akkapeddi discloses that the interrogating beam may interact with pump beam operating in the phase conjugator at a substantially transverse angle (Figure 2).

Regarding claim 40, Akkapeddi discloses a method (Figures 1 and 2) comprising:

transmitting an interrogating beam from a transceiver;

receiving the interrogating beam at an phase conjugator through apertures located in the top of the phase conjugator;

modulating data onto a phase conjugate beam; and

transmitting the phase conjugate beam to the transceiver.

Akkapeddi does not disclose an array of intra-cavity phase conjugators. As similarly discussed above with regard to claim 1, Watanabe teaches an intra-cavity conjugator (Figure 2) may be used in a system to produce a phase conjugate beam as in the system disclosed by Akkapeddi. Pepper et al. (Figures 9-10; column 10, lines 47-68; column 11, lines 1-17) teach another type of phase conjugator, but also further suggests that phase conjugators may be arranged in an array. It would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi as a way to provide a phase conjugate light beam without requiring a separate source of pump light, and to further arrange the phase conjugators in an array as taught by Pepper et al. to provide a broader area for producing phase conjugation.

The intra-cavity phase conjugator taught by Watanabe further includes a top electrode with an aperture (Figure 2, which shows current supplied to the phase conjugator from driver 7). Again, it would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi in view of Watanabe and Pepper et al. as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

Regarding claim 41, as similarly discussed with regard to claim 1 above, Akkapeddi disclose a method (Figures 1 and 2) comprising:

transmitting an interrogating beam from a transceiver;

receiving the interrogating beam at a phase conjugator and resolving a substantial portion of the spatial components of the input wavefront of the interrogating beam;

modulating data onto a phase conjugate beam; and

transmitting the phase conjugate beam to the transceiver.

Again, Akkapeddi does not disclose an array of intra-cavity phase conjugators. However, Watanabe teaches an intra-cavity conjugator (Figure 2) may be used in a system to produce a phase conjugate beam as in the system disclosed by Akkapeddi. Pepper et al. (Figures 9-10; column 10, lines 47-68; column 11, lines 1-17) teach that a plurality of phase conjugators arranged in an array may be used in a system to produce a phase conjugate beam as in the method disclosed by Akkapeddi. It would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi as a way to provide a phase conjugate light beam without requiring a separate source of pump light, and to further arrange the phase conjugators in an array as taught by Pepper et al. to provide a broader area for producing phase conjugation.

6. Claims 18-21, 48, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akkapeddi in view of Watanabe.

Regarding claim 18, Akkapeddi discloses a system (Figures 1 and 2) comprising:

a transceiver 10 constructed to transmit an interrogating beam;

a communication station capable of receiving the interrogating beam; and

the communication station having an phase conjugator 12.

Akkapeddi does not specifically disclose that the phase conjugator in an intra-cavity phase conjugator including a top electrode. However, as similarly discussed above with regard to claim 1, Watanabe teaches an intra-cavity conjugator (Figure 2) may be used in a system to produce a phase conjugate beam as in the system disclosed by Akkapeddi. The intra-cavity phase conjugator taught by Watanabe includes a top electrode with an aperture (Figure 2, which shows current supplied to the phase conjugator from driver 7). Regarding claim 20 in particular, Watanabe teaches that the phase conjugator may comprise a broad-area, distributed feedback laser device (Figure 2; column 16, column 23-67; column 17, lines 1-3). Regarding claim 48 in particular, Watanabe teaches that the intra-cavity phase conjugator with the top electrode includes a nonlinear medium adapted to produce at least two coherent pump beams (Figure 2) and a means to encode the coherent pump beams (Figure 16). Regarding claim 49 in particular, Watanabe teaches that the nonlinear medium is a diode structure comprising a modified broad-area distributed feedback laser device.

It would have been obvious to use the intra-cavity phase conjugator taught by Watanabe in the system disclosed by Akkapeddi as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

Regarding claim 19, Akkapeddi discloses that the interrogating beam may interact with at least one pump beam operating in the phase conjugator at a substantially transverse angle (Figure 2).

Regarding claim 21, Watanabe does not specifically teach that the aperture is greater than 10 microns, but it would have been obvious to a person of ordinary skill in the art to specify that the aperture taught by Watanabe in system described by Akkapeddi in view of Watanabe be greater than 10 microns as an engineering design choice of a way to allow sufficient light into the phase conjugator.

7. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akkapeddi et al. or Sharp et al., in view of Watanabe and Damen et al. (US 5,675,436 A)

Regarding claim 22, Akkapeddi (Figures 1 and 2) and Sharp et al. (Figures 2 and 5) disclose a system comprising:

a transceiver constructed to transmit an interrogating beam;

a communication station capable of receiving the interrogating beam; and

the communication station having an phase conjugator.

Neither Akkapeddi nor Sharp specifically disclose that the phase conjugator may be an intra-cavity phase conjugator which is a VCSEL structure. However, as similarly discussed above with regard to claim 1, Watanabe teaches that an intra-cavity conjugator (Figure 2) may be used in a system to produce a phase conjugate beam as in the system disclosed by Akkapeddi or Sharp. Watanabe teaches that the phase conjugator may comprise a broad-area, distributed feedback laser device (Figure 2; column 16, column 23-67; column 17, lines 1-3) but does not specifically teach that it may by a VCSEL structure. Damen et al. (column 3, lines 37-61) teach

that a VCSEL structure may be used to provide a nonlinear element for four wave mixing such as the laser device taught by Watanabe. Regarding claim 23 in particular, Watanabe further teaches that the interrogating beam interacts with at least one pump beam in a substantially parallel manner (Figure 2). It would have been obvious to use the intra-cavity phase conjugator which is a VCSEL structure taught by Watanabe and Damen et al. in the system disclosed by Akkapeddi or Sharp as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

8. Claims 24, 26-29, and 30-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe in view of MacDonald (US 5,519,723 A).

Regarding claim 24, Watanabe discloses an optical interconnection system (Figure 2) comprising:

a fiber optic device (fiber 2) constructed to transmit an interrogating beam (omega s) to a predetermined intra-cavity phase conjugator 1.

Although Watanabe discloses transmitting the interrogating beam through a fiber, Watanabe does not specifically disclose a transmitting device which creates the beam. However, it is well known in the art that laser beams such as disclosed by Watanabe may be created by transmitters, and it would have been obvious to a person of ordinary skill in the art to include a transmitter in order to provide the interrogating beam.

Watanabe does not specifically disclose a micro-mirror. However, it is well known in the art that mirrors and other reflectors may be used to steer light beams as desired among elements in an optical system. MacDonald in particular teaches using mirrors to steer light into a nonlinear medium for phase conjugation (Figure 1). It would have been obvious to a person of ordinary

skill in the art to use a mirror as taught by MacDonald in the system disclosed by Watanabe in order to steer the interrogating beam in whatever direction required by the placement of elements in the system.

Regarding claim 26, Watanabe discloses that the interrogating beam interacts with at least one pump beams operating in the phase conjugator in a substantially parallel manner (Figure 2).

Regarding claims 27 and 33, Watanabe further discloses that the phase conjugator may include a top electrode with an aperture (Figure 2).

Regarding claim 28, Watanabe discloses that the phase conjugator may comprise a broad-area, distributed feedback laser device (Figure 2; column 16, column 23-67; column 17, lines 1-3).

Regarding claim 29, Watanabe does not specifically disclose that the interrogating beam interacts with the at least one pump beam at a transverse angle. However, MacDonald teaches that an interrogating beam may interact with a pump beam in a phase conjugator such as disclosed by Watanabe at a transverse angle. It would have been obvious to a person of ordinary skill in the art to use an angle such as taught by MacDonald in the system described by Watanabe in view of MacDonald in order to accommodate the position of the elements in relation to each other.

Regarding claim 30, Watanabe discloses that the predetermined phase conjugator may be one of a plurality of phase conjugators arranged in an array (Figure 21). Regarding claim 31, Watanabe does not specifically disclose that this array may be a first array of a plurality of arrays, but it would have been obvious to a person of ordinary skill in the art to include a

plurality of arrays of phase conjugators in the system disclosed by Watanabe as an engineering design choice of a way to arrange the phase conjugators to accommodate however many separate signals needed in the system.

Regarding claim 32, Watanabe discloses that the phase conjugator may be signal gain stripe devices (column 16, lines 43-67; column 17, lines 1-3).

9. Claims 25 and rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al. (US 5,920,588 A) in view of MacDonald (US 5,519,723 A) as applied to claim 24 above, and further in view of Damen et al.

Regarding claim 25, Watanabe discloses that the phase conjugator may comprise a broad-area, distributed feedback laser device (Figure 2; column 16, column 23-67; column 17, lines 1-3) but does not specifically teach that it may by a VCSEL structure. Damen et al. (column 3, lines 37-61) teach that a VCSEL structure may be used to provide a nonlinear element for four wave mixing such as the laser device taught by Watanabe. It would have been obvious to use the intra-cavity phase conjugator which is a VCSEL structure taught by Watanabe and Damen et al. in the system disclosed by Akkapeddi or Sharp as a way to provide a phase conjugate light beam without requiring a separate source of pump light.

10. Claims 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharp et al. in view of Pepper et al.

Regarding claim 35, Sharp et al. disclose a method (Figures 2 and 5) comprising:

transmitting an interrogating beam from a transceiver 52;

receiving the interrogating beam at a communication station 50;

encoding data (with modulator 29) onto a phase conjugate beam; and

transmitting the encoded phase conjugate beam back to the transceiver (column 2, lines 26-42).

Sharp et al. do not specifically disclose pumping the encoded phase conjugate reflectivity by nondegenerate four wave mixing. However, Pepper et al. teach that four wave mixing is a known way of producing phase conjugate beams such as disclosed by Sharp et al. (column 1, lines 29-39). It would have been obvious to a person of ordinary skill in the art to specifically use four-wave as Pepper et al. teaches in the method disclosed by Sharp et al. as a known engineering deign choice of a way to produce the phase conjugate beam.

Regarding claim 36, Sharp et al. disclose a method (Figures 2 and 5) comprising:

transmitting an interrogating beam from a transceiver 52;

receiving the interrogating beam at a phase conjugator;

modulating data onto a phase conjugate beam (with modulator 29); and

transmitting the phase conjugate beam to the transceiver.

Sharp et al. does not specifically disclose an array of phase conjugators. However, Pepper et al. (Figures 9-10; column 10, lines 47-68; column 11, lines 1-17) teach that a plurality of phase conjugators arranged in an array may be used in a system to produce a phase conjugate beam as in the method disclosed by Sharp et al. It would have been obvious to a person of ordinary skill in the art to use a plurality of phase conjugators arranged in an array as taught by Pepper et al. in the method disclosed by Sharp et al. in order to provide a broader area to produce phase conjugation.

Regarding claim 37, Sharp et al. disclose that their method may further comprise collecting data through a sensor 24 located in proximity to the phase conjugator and transmitting the data to the phase conjugator (modulator 29).

Regarding claim 38, Sharp does not specifically disclose that the interrogating beam interacts with at least one pump beam operating in each of the phase conjugators in a substantially parallel manner. However, Pepper et al. teach that the interrogating beam may interact with pump beams operating in the plurality of phase conjugators in a substantially parallel manner (Figure 8). It would have been obvious to a person of ordinary skill in the art to arrange the interrogating beam and pump beams as suggested by Pepper et al. in the method disclosed by Sharp et al. as an engineering design choice of the most convenient angle.

Regarding claim 39, Sharp et al. discloses that the interrogating beam interacts with at least one pump beam operating in the phase conjugator in a substantially transverse manner (Figure 2).

Response to Arguments

11. Applicant's arguments with respect to claims 1-33 and 40-41 have been considered but are moot in view of the new ground(s) of rejection.

12. Applicant's arguments filed with respect to claims 34-39 and 42-44 have been fully considered but they are not persuasive. Regarding claims 34-39 and 42-44, in response to Applicants' argument on pages 10-12 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., specific details regarding how the phase conjugator is designed including even whether the phase conjugator is "intra-cavity") are not recited in the rejected claim(s). Although the claims are

interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600